F Electric Load Forecast

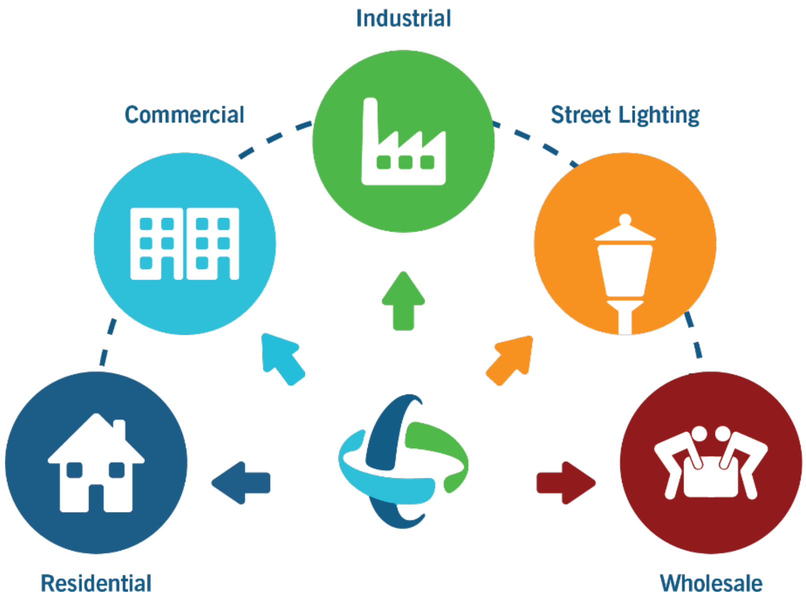
The Carolinas Carbon Plan (the "Plan" or "Carbon Plan") forecasts provide projections of the energy and peak demand needs for customers in Duke Energy Carolinas, LLC's ("DEC") and Duke Energy Progress, LLC's ("DEP" and, together with DEC, "Duke Energy" or the "Companies") service areas. Only by recognizing the size of the need for energy, including the dynamics that will shape that evolving need during the years to come, can a responsible plan to meet those needs be crafted.

The energy forecast projects the electric load required to serve Duke Energy's retail customer classes. As a product, it is more than just a number: it represents a series of descriptions, offered monthly, hourly or at time of peak, about how demand for energy will evolve under different possible futures. The Companies use econometric analysis to prepare models, which estimate how historically measured changes in sales can be attributed to variation in a series of predictive variables, measuring economic and weather conditions. It is most helpful to consider groups of customers that respond to similar economic dynamics.

Overview

The Companies develop the Load Forecast in four steps: (1) a service area economic forecast is obtained; (2) an energy forecast is prepared by estimating statistical models based on these economic conditions; (3) ex post modifications that account for the growth in electric vehicle, solar and energy efficiency programs must be considered; and (4) using the energy forecast, summer and winter peak demand forecasts are developed. The result allows analysis of the impact of varying inputs on sales, including substitution of different economic or weather. The forecasts cover 2023-2037 and represent the needs of the customer classes outlined in Figure F-1 below.

Figure F-1: Customer Classes



Energy projections are developed with econometric models using key economic factors such as income, electricity prices, industrial production indices, weather, appliance efficiency trends, rooftop solar trends and electric vehicle trends. Population is also used in the residential customer model.

The economic projections used in the Carbon Plan Forecast are obtained from Moody's Analytics, a nationally recognized economic forecasting firm, and include economic forecasts for the Carolinas. Moody's forecasts consist of economic and demographic projections, which are used in the energy and demand models.

The Retail forecast consists of the three major classes: Residential, Commercial and Industrial. The Residential class sales forecast comprises two projections; (1) the number of residential customers, which is driven by population; and (2) energy usage per customer, which is driven by weather, regional economic and demographic trends, electricity prices and appliance efficiencies.

The usage per customer forecast was derived using a Statistical Adjusted End-Use Model ("SAE"). This is a regression-based framework that uses projected appliance saturation and efficiency trends developed by Itron using Energy Information Administration ("EIA") data. It incorporates naturally occurring efficiency trends and government mandates more explicitly than other models, combining them with data on economic variables and weather to estimate how demand for energy would change over time as these factors change. The outlook for usage per customer via the end uses is essentially flat through much of the forecast horizon, so most of the growth is primarily due to increases in numbers of customers.

The Commercial forecast, which predicts aggregate energy demanded, also uses an SAE model to reflect naturally occurring as well as government mandated efficiency changes. The three largest sectors in the commercial class are Offices, Education and Retail.

Total energy from the Industrial class is forecasted by a standard econometric model, with drivers such as total manufacturing output and the price of electricity.

Weather impacts are incorporated into the models by using heating degree days with a base temperature of 59 degrees Fahrenheit and cooling degree days with a base temperature of 65 degrees Fahrenheit. The forecast of degree days is based on a 30-year average and updated every year.

The appliance saturation and efficiency trends are developed by Itron using data from EIA. Itron is a recognized firm providing forecasting services to the electric utility industry. These appliance trends are used in the residential and commercial sales models before the statistical estimation. To the extent that Duke Energy programs that motivate energy savings (energy efficiency programs) will affect future demand for energy, those are treated separately from these saturation/efficiency considerations and will be deducted from the load forecast afterward.

Peak demands are projected using the SAE approach and reflect an adjustment for the mix of end-uses at time of peak. The peak forecast was developed using a monthly SAE model, like the sales SAE models, which includes monthly appliance saturations and efficiencies, interactions with weather, and the fraction of each appliance type that is in use at the time of monthly peak.

Forecast Enhancements

The Companies began using the SAE model projections to forecast sales and peaks in 2013. The end-use models provide a better platform to recognize trends in equipment and appliance saturation, changes to efficiencies and how those trends interact with heating, cooling and "other" or non-weather-related sales. These appliance trends are used in the residential and commercial sales models. In conjunction with peer utilities and Itron, the Companies continually look for refinements to its modeling procedures to make better use of the forecasting tools and develop more reliable forecasts.

Each time the forecast is updated, the most currently available historical and projected data is used. The forecast presented herein utilizes:

- Moody's Analytics July 2021 base and consensus economic projections;
- End-use equipment and appliance indices that reflect the 2021 update of Itron's end-use data, which is consistent with EIA's 2021 Annual Energy Outlook; and
- A calculation of normal weather using the period 1991-2020.

The Companies also research weather sensitivity of summer and winter peaks, peak history, hourly shaping of sales and load research data in a continuous effort to improve forecast accuracy. Historical peaks and forecasted peaks are presented later in this Appendix.

The relationship between sales and climate change continues to be a concern. In order to better understand how climate change may impact future load, the Companies are developing a process to study this. The Companies are hoping to quantify both the temperature impacts, as well as the economic differences to develop a scenario that identifies changes to load based on these updated inputs. To identify changes to temperature, the Companies intend to use the Representative Concentration Pathway ("RCP") studies and include the assumed temperature changes at the local weather stations. The Companies have also had discussions with its economic data provider to obtain a climate change scenario, as climate change will impact more than just temperatures. Using this information, the Companies intend to develop a climate change scenario that can be useful for planning purposes.

Assumptions

Table F-1 below shows the projected average annual growth rates of several key drivers from the Carbon Plan Forecast. These statistics characterize a region enjoying consistent, durable long-term growth.

Annualized Growth Rates of Key Economic Drivers

Table F-1: Annualized Growth Rates of Key Economic Drivers

	2023-2037
Real Income	0.6%
Manufacturing Industrial Production Index ("IPI")	1.3%
Population	1.6%

In addition to economic, demographic and efficiency trends, the forecast also incorporates the expected impacts of utility energy efficiency ("UEE"), as well as projected effects of electric vehicles and behind-the-meter ("BTM") solar technology.

Utility Energy Efficiency

Utility Energy Efficiency ("UEE") Programs continue to accelerate the adoption of energy efficiency by customers. UEE specifically refers to the approved programs offered by DEC and DEP where participants actively take part in conservation and demand response measures offered under the EE/DSM riders within their service territory. These programs and measures are discussed in further detail in Appendix G (Grid Edge and Customer Programs). When accounting for the efficiency impacts to both energy and peak, careful attention must be paid to distinguishing between these UEE programs and the natural evolution of end-use efficiencies and saturations that would occur because of market forces, also referred to as naturally occurring energy efficiency.

Naturally occurring efficiency recognizes load reductions resulting from customers adopting efficiency measures that are not the direct result of a Duke Energy-approved program. These efficiency gains are included within the latent forecast variables via the described SAE procedure; this data from the EIA is distributed by Itron via the SAE package and used as predictors for the forecasting model estimation. Naturally occurring energy efficiencies on the part of customers are important to acknowledge, quantify, and remove from the Gross Load Forecast to prevent the double counting of UEE efficiencies with the naturally occurring efficiencies included in the SAE modeling approach.

As both UEE and naturally occurring efficiency gains are recognized to reduce load during the forecast period, careful attention must be paid to the timing of these efficiency gains to ensure there is not a double counting of these efficiencies. As UEE serves to accelerate the timing of naturally occurring efficiency gains, the forecast “rolls off” or ends the UEE savings at the conclusion of its measure life, a moment at which market-incentives would have brought end-use demands into alignment with the projections had the Duke Energy-based UEE programs not been in effect. For example, if the accelerated benefit of a residential UEE program is expected to have occurred seven years before the energy reduction program would have been otherwise adopted, then the UEE effects after year seven are subtracted (“rolled off”) from the total cumulative UEE. With the SAE model’s framework, the naturally occurring appliance efficiency trends replace the rolled off UEE benefits serving to continue to reduce the forecasted load resulting from energy efficiency adoption. The impact of this interaction between naturally occurring EE and UEE is to recognize the earlier adoption of energy efficiency improvements, lowering energy usage earlier than would have otherwise been expected, and continuing the benefit of the energy efficiency over the forecasting period.

For purposes of this document, UEE and energy efficiency (“EE”) terms may be used interchangeably to refer to approved utility programs unless otherwise noted. It is important to note that data regarding the change in metered energy that is attributed to UEE must be explicitly added to the forecast after estimation to properly account for how these efforts by Duke Energy will reduce the energy demanded by its customers. Tables F-2 and F-3 below illustrate the impact of this process on annual sales projections for DEC and DEP separately:

Table F-2: UEE Program Life Process (GWH) – DEC

Year	Forecast Before UEE	Historical UEE Roll Off	Forecast With Historical Roll Off	Forecasted UEE Incremental Roll On	Forecasted UEE Incremental Roll Off	UEE to Subtract From Forecast	Forecast After UEE
2023	92,638	5	92,642	(992)	333	(659)	91,983
2024	93,358	43	93,401	(1,430)	333	(1,097)	92,304
2025	93,752	134	93,886	(1,870)	333	(1,537)	92,349
2026	94,340	294	94,634	(2,301)	334	(1,967)	92,667
2027	94,961	526	95,487	(2,722)	335	(2,387)	93,100
2028	95,786	818	96,604	(3,126)	337	(2,789)	93,815
2029	96,726	1,065	97,792	(3,506)	343	(3,163)	94,629
2030	97,569	1,386	98,955	(3,863)	361	(3,501)	95,454
2031	98,663	1,603	100,266	(4,196)	396	(3,800)	96,466
2032	99,741	1,745	101,486	(4,505)	466	(4,039)	97,447
2033	100,770	1,827	102,597	(4,791)	566	(4,225)	98,372
2034	101,800	1,867	103,667	(5,057)	703	(4,354)	99,313
2035	102,847	1,882	104,729	(5,309)	869	(4,440)	100,289
2036	103,884	1,882	105,766	(5,544)	1,062	(4,482)	101,284

Year	Forecast Before UEE	Historical UEE Roll Off	Forecast With Historical Roll Off	Forecasted UEE Incremental Roll On	Forecasted UEE Incremental Roll Off	UEE to Subtract From Forecast	Forecast After UEE
2037	104,843	1,882	106,726	(5,762)	1,379	(4,383)	102,343

Table F-3: UEE Program Life Process (GWH) – DEP

Year	Forecast Before UEE	Historical UEE Roll Off	Forecast With Historical Roll Off	Forecasted UEE Incremental Roll On	Forecasted UEE Incremental Roll Off	UEE To Subtract From Forecast	Forecast After UEE
2023	64,622	14	64,636	(531)	154	(377)	64,259
2024	65,217	46	65,263	(781)	154	(627)	64,636
2025	65,300	102	65,402	(1,031)	154	(877)	64,525
2026	65,349	183	65,533	(1,280)	155	(1,125)	64,408
2027	65,576	279	65,855	(1,525)	156	(1,369)	64,486
2028	65,967	383	66,350	(1,754)	156	(1,598)	64,752
2029	66,390	461	66,851	(1,960)	159	(1,800)	65,051
2030	66,795	557	67,352	(2,142)	166	(1,976)	65,376
2031	67,299	618	67,917	(2,301)	180	(2,122)	65,795
2032	67,955	658	68,613	(2,438)	216	(2,222)	66,391
2033	68,537	682	69,219	(2,552)	270	(2,282)	66,937
2034	69,190	694	69,885	(2,653)	338	(2,315)	67,570
2035	69,886	700	70,587	(2,749)	416	(2,333)	68,254
2036	70,651	700	71,351	(2,839)	514	(2,325)	69,026
2037	71,372	700	72,073	(2,924)	668	(2,256)	69,817

Critical Peak Pricing

The Critical Peak Pricing ("CPP") Rate Rider is a dynamic overlay option for Duke Energy's electric service, including both its existing flat volumetric rates, as well as its existing and newly proposed time-of-use ("TOU") rates. This time variant pricing option allows Duke Energy to call critical events up to 20 times per year ("20 CP") based on system conditions such as expected extreme temperatures, high energy usage, high market energy costs or major generation or transmission outages. Customers enrolled will be alerted the day before a critical event is expected and agree to pay a higher price for peak time electricity use during these critical events, encouraging reductions in demand. Daily load and peak impacts for CPP were included in the peak demand projections for DEC and DEP in the Carbon Plan. The critical events (20 CP) were modeled to impact the projected 10 highest winter days and 10 highest summer days in each year of the Carbon Plan.

Table F-4 below shows the CPP projected peak reduction capabilities for Winter and Summer demands:

Table F-4: CPP Peak Reduction Capabilities (MW) – DEC and DEP

	DEC		DEP	
Year	**Summer (MW)**	**Winter (MW)**	**Summer (MW)**	**Winter (MW)**
2023	20	13	12	8
2024	39	29	24	18
2025	62	50	38	30
2026	91	76	55	46
2027	125	107	76	65
2028	164	144	100	87
2029	206	185	126	112
2030	251	229	153	139
2031	296	274	180	167
2032	339	318	207	194
2033	378	359	231	219
2034	413	396	252	242
2035	441	428	270	261
2036	465	454	284	277
2037	484	475	296	290

Rooftop Solar

Net energy metering ("NEM") is currently available in the Carolinas. The forecast used in the Plan reflects impacts from approved NEM rates in the Carolinas as of January 1, 2022, which are decremented directly from the initial Itron model output. Table F-5 below summarizes the number of current customers enrolled in net metering rate programs for both the DEP and DEC service areas by customer class, as well as the total energy in megawatt-hours ("MWh") forecasted to be generated from behind-the-meter ("BTM") solar generation on customer sites in 2022.

Table F-5: Number of Customers Enrolled in Net Metering Rate Programs and Forecasted BTM Generation

	2022 Enrollment (as of 1/1/2022)		2022 BTM Generation Forecast	
System	**Residential**	**Non-Residential**	**Residential**	**Non-Residential**
DEC	22,252	745	223,447 MWh	86,816 MWh
DEP	14,017	477	138,325 MWh	44,755 MWh

There has been a strong focus recently on net metering reform, tying net metering to Time-Of-Use schedules, and developing new and innovative programs coupling rooftop solar, net metering, TOU and energy efficiency offerings. The Companies continue to work with stakeholders to develop new rate designs and complementary programs that are discussed further in Appendix G (Grid Edge and Customer Programs).

Modeling NEM Adoption

Residential rooftop solar systems are limited in size under state law in the Carolinas, which requires the facility to be less than 20 kilowatts-alternating current ("kW-AC"), also referred to as nameplate capacity for solar facilities. Non-residential customers' solar systems may not exceed the lesser of 1,000 kW-AC or 100% of the customer's contract demand, which approximates the customer's maximum expected demand. Table F-6 below shows the average size of rooftop solar facilities in the Carolinas.

Table F-6: Average Rooftop Solar Capacity (kW-AC)

Customer Class	DEC-NC	DEC-SC
Residential	6.2	8.3
Non-residential	69	105
Customer Class	**DEP-NC**	**DEP-SC**
Residential	6.5	7.9
Non-residential	63	86

The rooftop solar generation forecast is derived from a series of capacity forecasts and hourly production profiles tailored to residential, commercial and industrial customer classes.

Each capacity forecast is the product of a customer adoption forecast and an average capacity value. The adoption forecasts are developed using economic models of payback, which is a function of installed cost, regulatory incentives, regulatory statutes and bill savings. A relationship between payback and customer adoption is developed through regression modeling, with the resulting regression equations used to predict future customer adoptions based on projected payback curves.

Historical and projected technology costs are sourced from Guidehouse, while projected incentives and bill savings are based on current regulatory policies as well as input from internal subject matter experts. Average system size (capacity) values are based on trends in historical adoption.

The hourly production profiles have 12x24 resolution, which equates to one 24-hour profile for each month. Profiles are derived from actual production data, where available, and solar photovoltaic ("PV") modeling. The PV modeling is performed in the PVsyst model using 20+ years of historical irradiance data sourced from Solar Anywhere and Solcast. Models are created for 13 irradiance locations across DEC's service area and nine irradiance locations across DEP's service area with 21 tilt/azimuth configurations. The results for each jurisdiction are combined on a weighted average basis to produce the final profiles.

Table F-7 below shows the Companies' growth projection for new solar customers and new energy benefits from 2022 through 2030 under the currently approved net metering rate designs in the Carolinas as of January 1, 2022.

Table F-7: 2030 Rooftop Solar, Net New from 2022 through 2030

	DEC		DEP	
	Residential	Non-Residential	Residential	Non-Residential
Number of Customers	38,464	1,050	20,839	846
Energy (MWh)	354,255	92,192	189,168	62,092

Customer Growth

Tables F-8 through F-11 below show the history and projections for customers. Historical Retail Customer growth over the presented period was 1.5% and 1.4% respectively for DEC and DEP, while projected Retail customer growth is 0.9% and 1.0%, respectively for DEC and DEP.

Table F-8: Historical Retail Customers (Annual Average in Thousands) – DEC

Year	Residential Customers	Commercial Customers	Industrial Customers	Other Customers	Retail Customers
2012	2,053	337	7	14	2,411
2013	2,068	339	7	14	2,428
2014	2,089	342	7	15	2,452
2015	2,117	345	6	15	2,484
2016	2,148	349	6	15	2,519
2017	2,182	354	6	15	2,557
2018	2,215	358	6	17	2,596
2019	2,261	362	6	22	2,651
2020	2,306	367	6	23	2,702
2021	2,350	392	6	16	2,764
Avg. Annual Growth Rate	1.5%	1.7%	-1.4%	1.4%	1.5%

Table F-9: Historical Retail Customers (Annual Average in Thousands) – DEP

Year	Residential Customers	Commercial Customers	Industrial Customers	Other Customers	Retail Customers
2012	1,231	219	4	2	1,457
2013	1,242	222	4	2	1,470
2014	1,257	223	4	2	1,486
2015	1,275	226	4	2	1,507
2016	1,292	229	4	2	1,527
2017	1,310	232	4	1	1,547
2018	1,331	235	4	1	1,571
2019	1,349	237	4	1	1,591
2020	1,375	239	4	1	1,620
2021	1,397	242	4	2	1,644
Avg. Annual Growth Rate	1.4%	1.1%	-1.8%	-0.9%	1.4%

Table F-10: Projected Retail Customers (Thousands, Annual Average) – DEC

Year	Residential Customers	Commercial Customers	Industrial Customers	Other Customers	Retail Customers
2023	2,427	407	6	13	2,853
2024	2,451	409	6	13	2,879
2025	2,472	412	6	13	2,902
2026	2,491	415	6	13	2,924
2027	2,512	418	6	13	2,948
2028	2,535	420	6	13	2,974
2029	2,560	423	6	13	3,001
2030	2,585	426	6	13	3,030
2031	2,611	430	6	13	3,059
2032	2,636	433	6	13	3,087
2033	2,661	436	5	13	3,115
2034	2,686	439	5	13	3,143
2035	2,709	442	5	13	3,169
2036	2,731	445	5	13	3,193
2037	2,751	448	5	13	3,217
Avg. Annual Growth Rate	0.9%	0.7%	-0.8%	-0.2%	0.9%

Table F-11: Projected Retail Customers (Thousands, Annual Average) – DEP

Year	Residential Customers	Commercial Customers	Industrial Customers	Other Customers	Retail Customers
2023	1,434	249	4	1	1,688
2024	1,449	251	4	1	1,706
2025	1,464	253	4	1	1,723
2026	1,478	256	4	1	1,739
2027	1,493	258	4	1	1,756
2028	1,508	260	4	1	1,774
2029	1,524	263	4	1	1,792
2030	1,540	265	4	1	1,810
2031	1,556	267	4	1	1,828
2032	1,571	270	4	1	1,847
2033	1,587	272	4	1	1,865
2034	1,603	275	4	1	1,883
2035	1,618	277	4	1	1,900
2036	1,633	279	4	1	1,917
2037	1,647	282	4	1	1,934
Avg. Annual Growth Rate	1.0%	0.9%	-0.2%	0.4%	1.0%

Electric Vehicles

The Biden Administration has recently announced a goal of 50% of new U.S. passenger car and light truck sales being electric by 2030.[1] Major automakers, including Ford, GM and Stellantis, have also announced an aspiration to achieve 40%-50% of new vehicle sales be electric by 2030. New vehicle sales are only a portion of the vehicles in operation, but the load growth associated with charging electric vehicles ("EV") is expected to accelerate over the planning horizon.

Duke Energy's EV load forecast is derived using the Vehicle Analytics and Simulation Tool ("VAST"). A series of EV forecasts and load charging profiles are generated in VAST to produce an hourly load forecast broken down by three duties: light, medium and heavy. All three duties are calculated using similar methodology and make up the EV load forecast that is added to the Duke Energy load forecast.

Multiple parameters are accounted for when developing the EV adoption forecast including historical data, such as vehicle registrations, vehicle utilization characteristics, projections of cost, vehicle availability, charging infrastructure availability and consumer acceptance.

Based on the adoption forecast and the projected amount of energy needed to charge the EVs, hourly EV demand profiles are developed in VAST using third-party charging characteristic data for the different types of vehicles and chargers. The VAST tool then combines the EV vehicle forecast and the hourly load profiles to develop jurisdictional hourly level load profiles that are used in the Duke Energy load forecast.

Table F-12 and Table F-13 below show the projected incremental additions of EVs in operation, along with the impacts on energy, near the beginning and ending of the planning horizon.

Table F-12: Electric Vehicles, EVs in Operation and Load Impacts – DEC

Year	EVs In Operation	Percent Of Vehicle Fleet	Load (MWh/Year)
2022	33,293	.59%	24,500
2035	453,289	5.5%	2,850,000

Table F-13: Electric Vehicles, EVs In Operation and Load Impacts – DEP

Year	EVs In Operation	Percent Of Vehicle Fleet	Load (MWh/Year)
2022	24,667	.74%	17,700
2035	311,976	6.28%	1,800,000

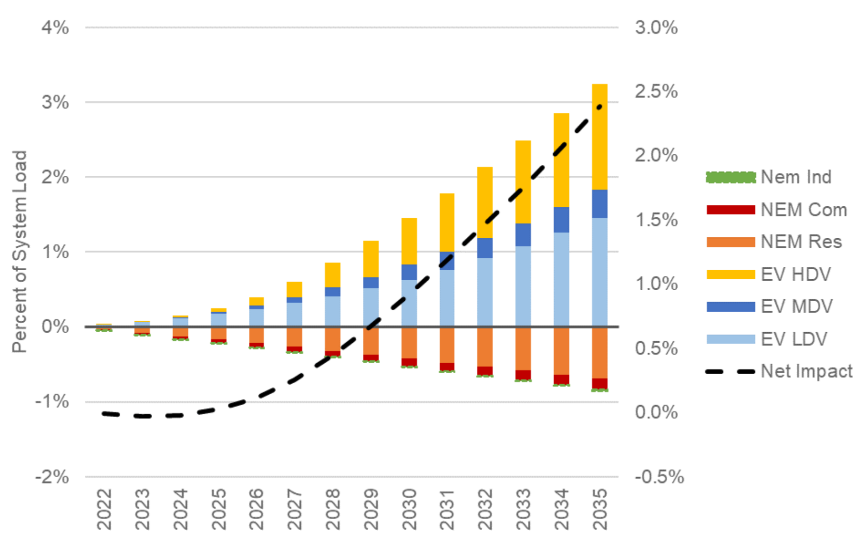
[1] FACT SHEET: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks | The White House.

Transportation electrification ("TE") is expected to have the largest impact on electricity demand in the future[2] with the National Renewable Energy Laboratory ("NREL") forecasting that the EV transition will result in a 20% to 38% increase in electricity consumption by 2050. Executive Order 246 ("EO 246"),[3] signed by Governor Roy Cooper in January directed the North Carolina Department of Transportation ("NC DOT") to develop a comprehensive Clean Transportation Plan aimed at supporting the Order's aspirational goal of 1.25 million registered zero-emission vehicles on the road by 2030. Duke Energy forecasts, which will likely be updated as EO 246 activities are underway and federal funding is deployed, show approximately 310,000 light-duty and nearly 12,000 medium- and heavy-duty vehicles will shift from gas-powered to electric significantly contributing to load growth from 2022 through 2030 while also reducing CO_2 emissions across the Carolinas. The cumulative CO_2 emissions reduction in the transportation sector is projected to reach 8.6 million tons by 2030, even when accounting for the increased generation requirements needed to meet the energy needs of this transition. Importantly, as EO 246 recognizes, this shift to electric vehicles decarbonizes the broader economy of North Carolina while offering opportunities for economic growth and consumer savings in the State.

Net Impact of Rooftop Solar and Electric Vehicles

Figures F-2 through F-7 illustrate the impacts on annual energy, winter peak demand and summer peak demand from rooftop solar and EVs by customer class across the planning horizon. The load forecast is incremented by these projections.

Figure F-2: Percent Impact of PV and EV on Annual Load in DEC, Net New from 2022



[2] Blonsky, M., et al. "Potential Impacts of Transportation and Building Electrification on the Grid: A Review of Electrification Projections and Their Effects on Grid Infrastructure, Operation, and Planning." *Current Sustainable Renewable Energy Reports.* 13 November 2019. https://www.osti.gov/pages/servlets/purl/1576484.

[3] https://governor.nc.gov/media/2907/open.

Figure F-3: Percent Impact of PV and EV on Annual Load in DEP, Net New from 2022

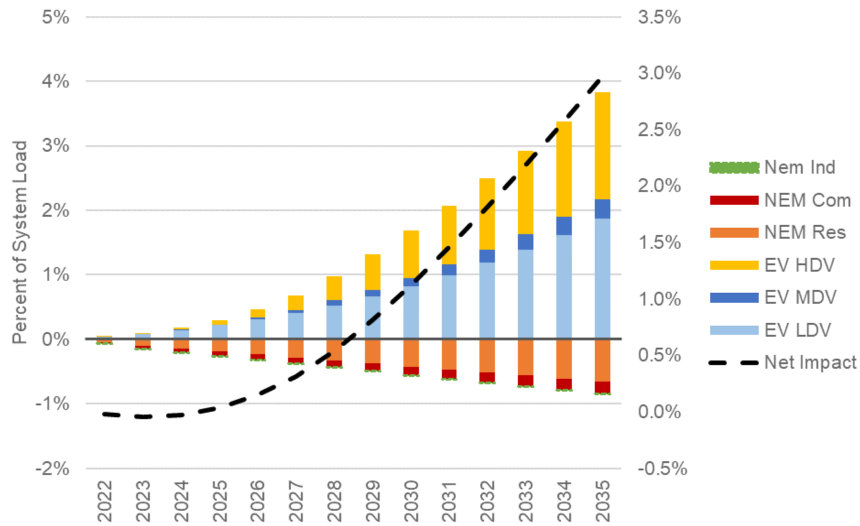


Figure F-4: Percent Impact of PV and EV on Winter Peak Load in DEC, Net New from 2022

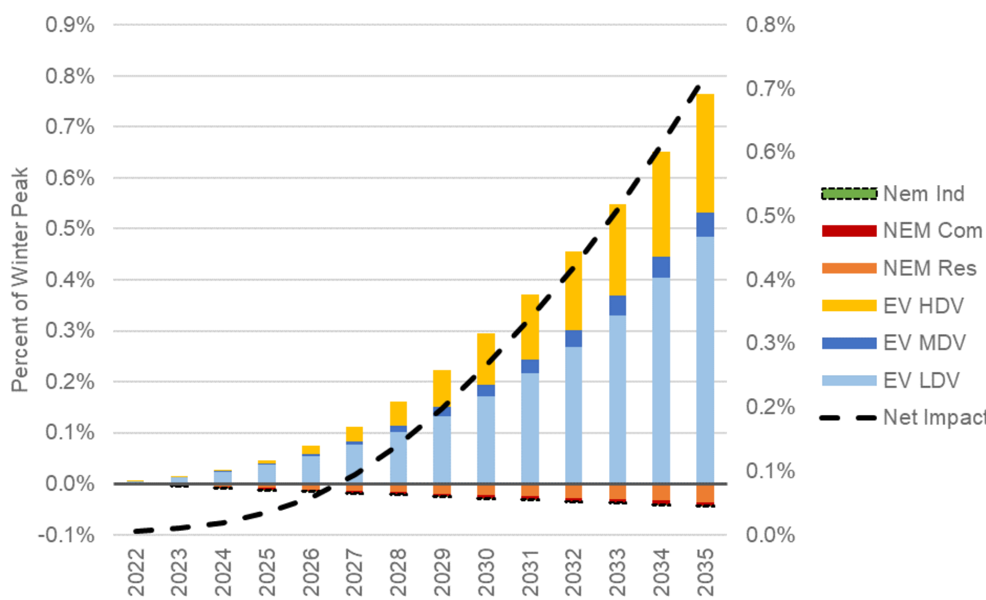


Figure F-5: Percent Impact of PV and EV on Winter Peak Load in DEP, Net New from 2022

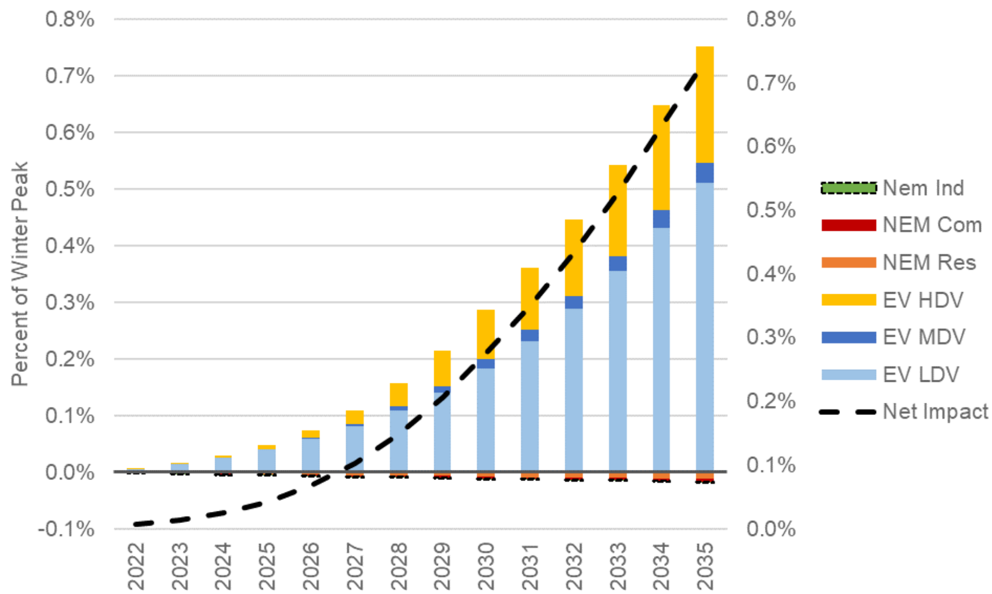


Figure F-6: Percent Impact of PV and EV on Summer Peak Load in DEC, Net New from 2022

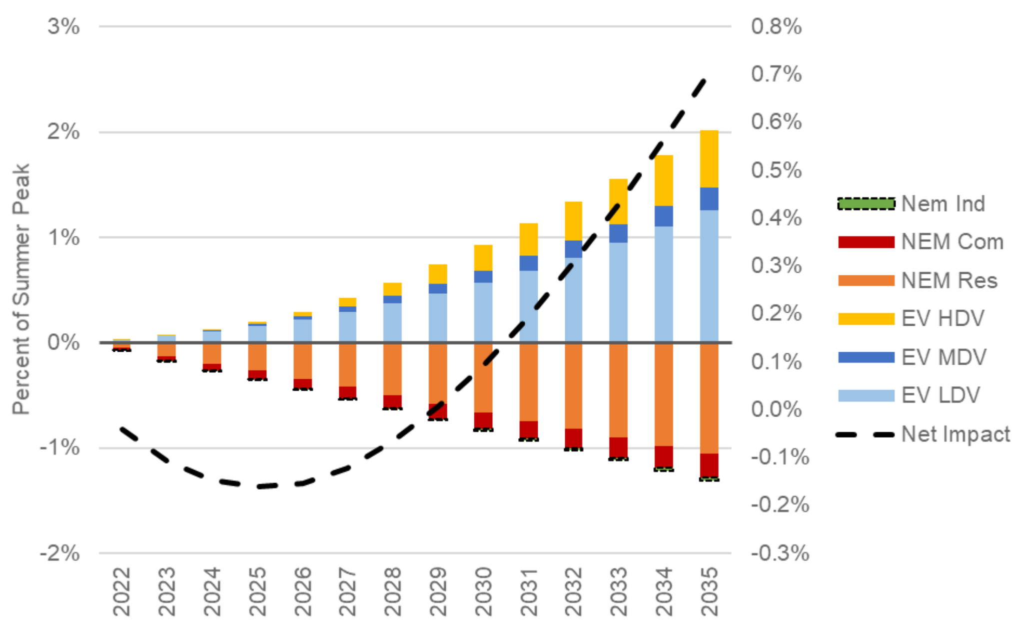
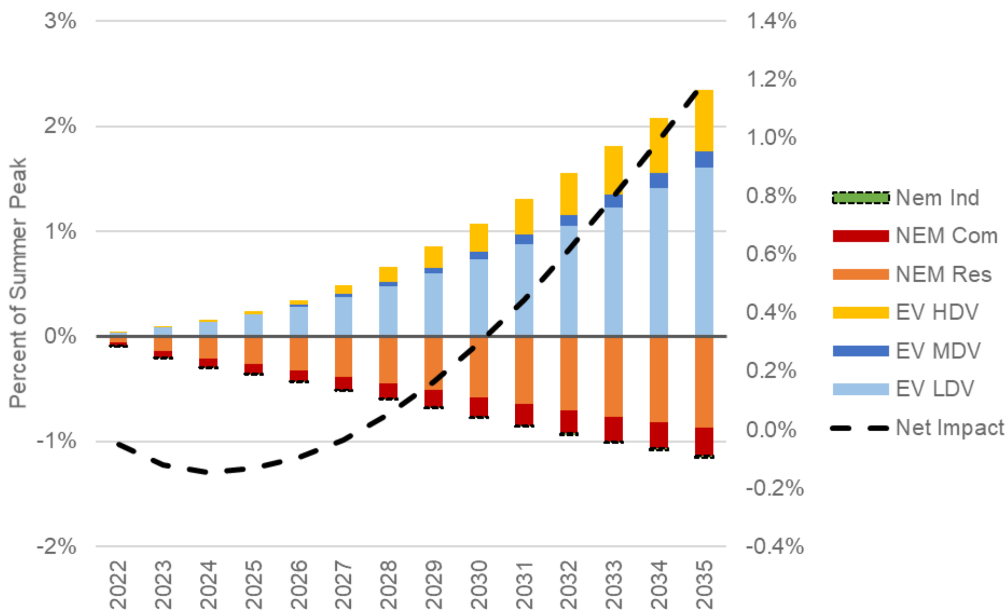


Figure F-7: Percent Impact of PV and EV on Summer Peak Load in DEP, Net New from 2022



Electricity Sales Historical Data

Tables F-14 and F-15 below show actual historical gigawatt-hour ("GWh") sales for DEC and DEP. As a note, the values are not weather adjusted sales. Historical Retail Sales growth over the presented period was 0.9% and 0.8% respectively for DEC and DEP.

Table F-14: Electricity Sales (GWh) – DEC

Year	Residential GWh	Commercial GWh	Industrial GWh	Military & Other GWh	Retail GWh	Wholesale GWh	Total System GWh
2012	26,279	27,476	20,978	290	75,023	5,176	80,199
2013	26,895	27,765	21,070	293	76,023	5,824	81,847
2014	27,976	28,421	21,577	303	78,277	6,559	84,836
2015	27,916	28,700	22,136	305	79,057	6,916	85,973
2016	27,939	28,906	21,942	304	79,091	7,614	86,705
2017	26,593	28,388	21,776	301	77,059	7,558	84,617
2018	29,717	29,656	21,720	306	81,399	8,889	90,288
2019	28,861	29,628	21,299	320	80,109	8,317	88,426
2020	27,963	27,637	19,593	314	75,506	7,616	83,123
2021	29,244	28,760	20,611	300	78,915	7,966	86,880
Avg. Annual Growth Rate	1.2%	0.5%	-0.2%	0.4%	0.6%	4.9%	0.9%

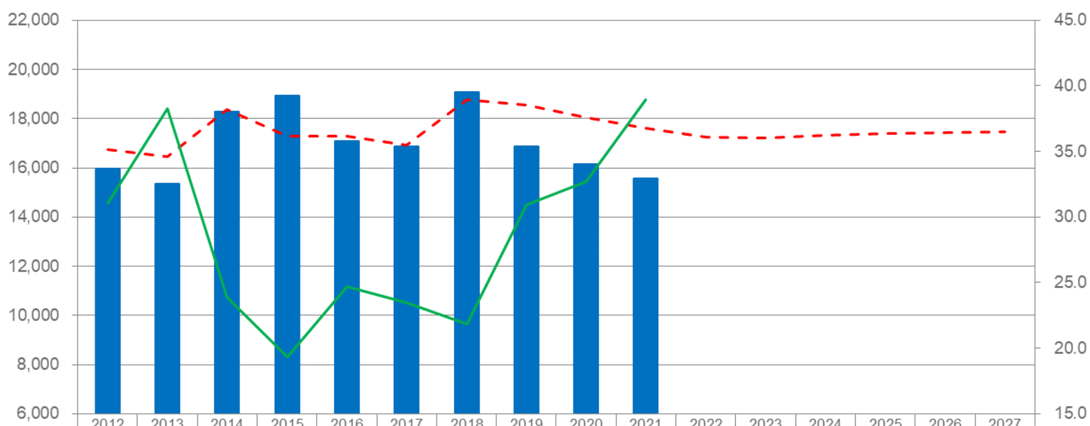
Table F-15: Electricity Sales (GWh) – DEP

Year	Residential GWh	Commercial GWh	Industrial GWh	Military & Other GWh	Retail GWh	Wholesale GWh	Total System GWh
2012	17,764	13,709	10,573	1,591	43,637	12,267	55,903
2013	16,663	13,581	10,508	1,602	42,355	12,676	55,031
2014	18,201	13,887	10,321	1,614	44,023	13,578	57,601
2015	17,954	14,039	10,288	1,597	43,876	15,782	59,658
2016	17,686	14,082	10,274	1,563	43,606	18,676	62,282
2017	17,228	13,903	10,391	1,531	43,053	18,242	61,295
2018	18,939	14,219	10,475	1,560	45,194	19,331	64,525
2019	18,177	13,992	10,534	1,537	44,241	18,694	62,935
2020	17,587	12,894	10,122	1,495	42,099	17,216	59,315
2021	18,645	12,941	9,343	1,389	42,318	17,821	60,139
Avg. Annual Growth Rate	0.5%	-0.6%	-1.4%	-1.5%	-0.3%	4.2%	0.8%

System Peaks

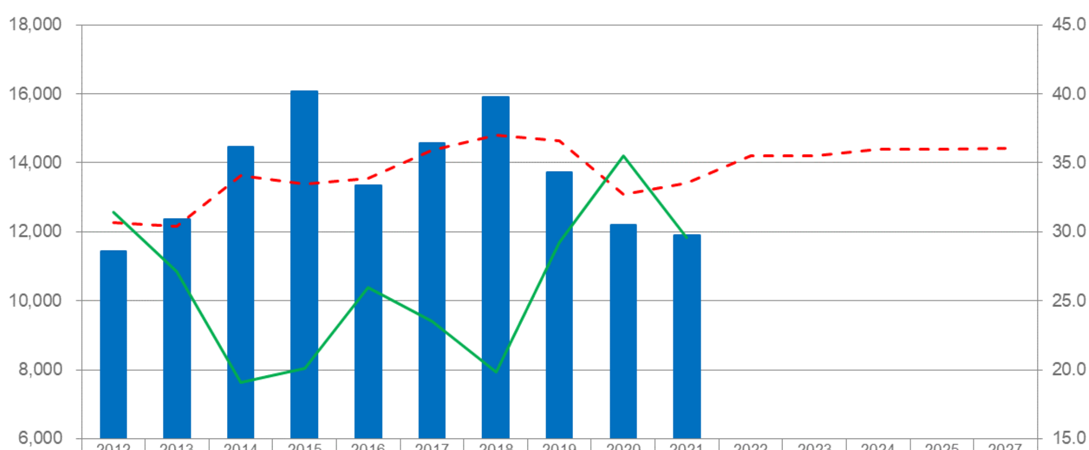
The Figures F-8 through F-11 below show the historical actual and weather normalized peaks for the systems. As a note, the Weather Normal Peak/Forecast values in years 2022-2027 are forecasted peak values from the Plan Forecast and the temperatures are the average daily temperature on the day of the peak.

Figure F-8: DEC Actual and Weather Normal Winter Peaks



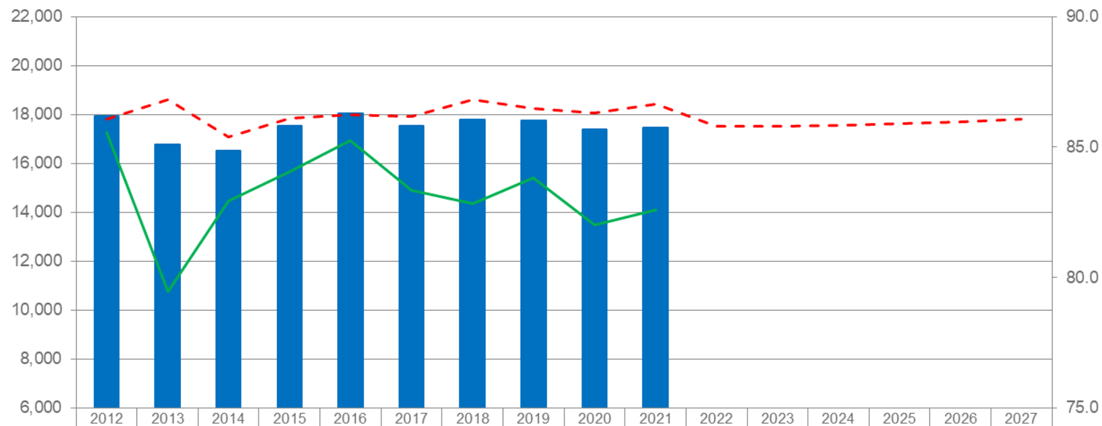
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual	15,962	15,363	18,275	18,931	17,073	16,883	19,077	16,880	16,132	15,583						
WN Peak/Forecast	16,733	16,464	18,362	17,294	17,305	16,908	18,783	18,548	18,038	17,620	17,252	17,231	17,333	17,383	17,442	17,461
Temp	31.1	38.3	23.9	19.4	24.7	23.4	21.9	30.9	32.7	39.0						

Figure F-9: DEP Actual and Weather Normal Winter Peaks



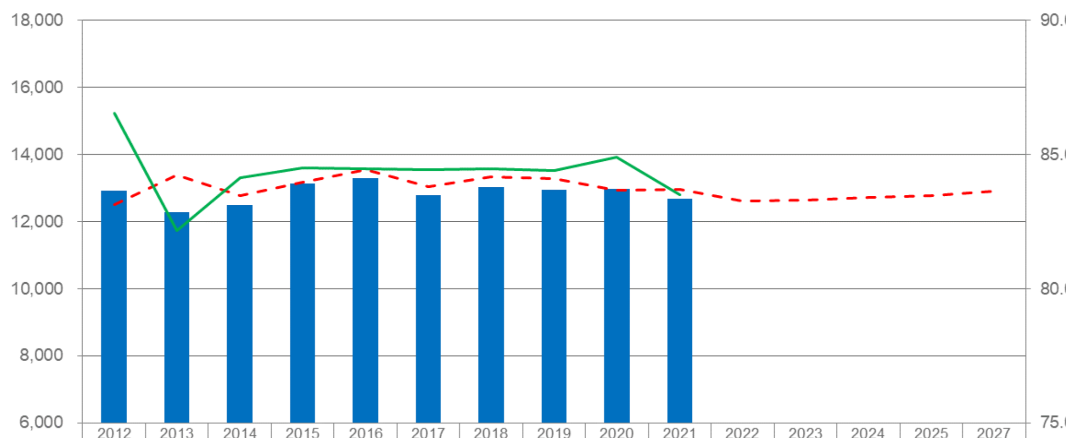
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2027
Actuals	11,440	12,376	14,453	16,080	13,357	14,583	15,897	13,715	12,196	11,894					
WN Peak/Forecast	12,261	12,161	13,635	13,377	13,556	14,356	14,797	14,640	13,079	13,413	14,202	14,206	14,387	14,387	14,432
Temp	31.5	27.1	19.1	20.1	26.0	23.5	19.8	29.2	35.5	29.6					

Figure F-10: DEC Actual and Weather Normal Summer Peaks



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Actual	17,933	16,757	16,501	17,529	18,037	17,539	17,779	17,736	17,405	17,471						
WN Peak/Forecast	17,822	18,593	17,093	17,832	17,992	17,917	18,613	18,233	18,044	18,432	17,497	17,522	17,569	17,640	17,710	17,788
Temp	85.5	79.5	82.9	84.1	85.3	83.3	82.8	83.8	82.0	82.6						

Figure F-11: DEP Actual and Weather Normal Summer Peaks



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2027
Actuals	12,912	12,273	12,497	13,134	13,296	12,792	13,029	12,953	12,966	12,691					
WN Peak/Forecast	12,520	13,378	12,778	13,188	13,554	13,038	13,339	13,279	12,925	12,970	12,625	12,655	12,726	12,763	12,904
Temp	86.5	82.2	84.1	84.5	84.5	84.4	84.5	84.4	84.9	83.5					

Forecast Results

A tabulation of the Companies' sales and peak forecasts are shown in Tables F-16 through F-23 below:

- Forecasted energy sales by class (including the impacts of UEE, rooftop solar and electric vehicles)
- Projected Retail sales growth is 0.8% and 0.4% for DEC and DEP

- Forecast energy sales – gross load to net load (walkthrough of impacts from UEE, rooftop solar, electric vehicles and voltage control program)
- Summary of the load forecast without UEE programs and excluding any impacts from demand reduction programs
- Summary of the load forecast with UEE programs and excluding any impacts from demand reduction programs
  - Projected Winter and Summer demand growth for DEC is 0.8% and 1.0%
  - Projected Winter and Summer demand growth for DEP is 0.6% and 0.8%

These projections include wholesale; the loads and energy in the tables below are at generation, except for the class sales forecast, which is at meter.

Load duration curves, with and without UEE programs are shown as Figures F-12 through F-15 below. The values in these tables and figures reflect the loads that Duke Energy Carolinas and Duke Energy Progress are contractually obligated to provide and cover the period from 2023 to 2037.

Table F-16: Forecasted Energy Sales by Class – DEC

Year	Residential GWh	Commercial GWh	Industrial GWh	CPP GWh	Other GWh	Retail GWh
2023	30,293	28,453	20,921	(1)	279	79,945
2024	30,391	28,428	21,035	(2)	280	80,132
2025	30,419	28,314	21,095	(3)	279	80,105
2026	30,582	28,349	21,121	(4)	278	80,326
2027	30,890	28,268	21,223	(6)	277	80,651
2028	31,164	28,365	21,430	(8)	275	81,226
2029	31,424	28,501	21,748	(10)	273	81,937
2030	31,700	28,636	22,045	(12)	270	82,639
2031	31,996	28,831	22,450	(14)	268	83,530
2032	32,292	29,045	22,822	(17)	265	84,407
2033	32,565	29,242	23,180	(19)	262	85,231
2034	32,870	29,443	23,509	(21)	259	86,060
2035	33,184	29,654	23,848	(22)	257	86,919
2036	33,501	29,892	24,158	(24)	254	87,781
2037	33,791	30,165	24,556	(25)	251	88,739
Avg. Annual Growth Rate	0.8%	0.4%	1.2%	31.0%	-0.8%	0.7%

Note: Values are at meter.

Table F-17: Forecasted Energy Sales by Class – DEP

Year	Residential GWh	Commercial GWh	Industrial GWh	CPP GWh	Other GWh	Retail GWh
2023	18,921	14,071	10,212	(1)	1,582	44,785
2024	19,116	14,116	10,153	(1)	1,573	44,957
2025	18,996	14,032	10,085	(2)	1,562	44,673
2026	18,866	13,958	10,020	(3)	1,538	44,379
2027	18,864	13,970	9,927	(5)	1,515	44,271
2028	18,912	14,023	9,875	(6)	1,488	44,292
2029	18,973	14,111	9,856	(9)	1,472	44,403
2030	19,061	14,171	9,862	(10)	1,441	44,525
2031	19,196	14,261	9,885	(12)	1,430	44,760
2032	19,364	14,376	9,923	(14)	1,417	45,066
2033	19,545	14,499	9,972	(15)	1,401	45,402
2034	19,777	14,636	10,012	(15)	1,390	45,800
2035	20,031	14,787	10,055	(18)	1,385	46,240
2036	20,318	14,961	10,114	(19)	1,372	46,746
2037	20,599	15,147	10,205	(20)	1,364	47,295
Avg. Annual Growth Rate	0.6%	0.5%	0.0%	32.5%	-1.1%	0.4%

Note: Values are at meter.

Table F-18 Forecasted Energy Sales – Gross Load to Net Load – DEC

Year	Gross Retail Sales	Energy Efficiency	Rooftop Solar	Electric Vehicles	Voltage Control (IVVC)	Critical Peak Pricing (CPP)	Net Retail Sales
2023	80,665	(659)	(86)	62	(37)	(1)	79,945
2024	81,321	(1,097)	(136)	120	(74)	(2)	80,132
2025	81,997	(1,537)	(181)	202	(374)	(3)	80,105
2026	82,583	(1,967)	(229)	320	(377)	(4)	80,326
2027	83,220	(2,387)	(279)	484	(381)	(6)	80,651
2028	84,042	(2,789)	(333)	697	(384)	(8)	81,226
2029	84,945	(3,163)	(389)	940	(388)	(10)	81,937
2030	85,780	(3,501)	(446)	1,210	(391)	(12)	82,639
2031	86,745	(3,800)	(505)	1,498	(395)	(14)	83,530
2032	87,614	(4,039)	(566)	1,813	(398)	(17)	84,407
2033	88,365	(4,225)	(626)	2,137	(402)	(19)	85,231
2034	89,043	(4,354)	(689)	2,486	(405)	(21)	86,060
2035	89,690	(4,440)	(753)	2,853	(409)	(22)	86,919
2036	90,273	(4,482)	(820)	3,246	(413)	(24)	87,781
2037	90,809	(4,383)	(884)	3,637	(416)	(25)	88,739

Note: Values are at meter.

Table F-19: Forecasted Energy Sales – Gross Load to Net Load – DEP

Year	Gross Retail Sales	Energy Efficiency	Rooftop Solar	Electric Vehicles	Voltage Control (IVVC)	Critical Peak Pricing (CPP)	Net Retail Sales
2023	45,223	(377)	(64)	44	(39)	(1)	44,786
2024	45,676	(627)	(93)	81	(78)	(1)	44,957
2025	45,929	(877)	(116)	132	(395)	(2)	44,672
2026	45,840	(1,125)	(139)	205	(398)	(3)	44,379
2027	45,908	(1,369)	(166)	305	(402)	(5)	44,272
2028	46,060	(1,598)	(194)	436	(406)	(6)	44,292
2029	46,256	(1,800)	(222)	587	(409)	(9)	44,403
2030	46,420	(1,976)	(251)	755	(413)	(10)	44,525
2031	46,655	(2,122)	(280)	937	(417)	(12)	44,761
2032	46,897	(2,222)	(310)	1,135	(420)	(14)	45,066
2033	47,121	(2,282)	(339)	1,341	(424)	(15)	45,401
2034	47,365	(2,315)	(369)	1,562	(428)	(15)	45,799
2035	47,629	(2,333)	(400)	1,794	(432)	(18)	46,240
2036	47,916	(2,325)	(433)	2,043	(436)	(19)	46,746
2037	48,187	(2,256)	(463)	2,290	(442)	(20)	47,295

Note: Values are at meter.

Table F-20: Summary of the Load Forecast Without UEE Programs and Excluding any Impacts from Demand Reduction Programs – DEC

Year	Summer (MW)	Winter (MW)	Energy (GWh)
2023	17,650	17,312	92,642
2024	17,773	17,486	93,401
2025	17,920	17,610	93,886
2026	18,064	17,739	94,634
2027	18,210	17,857	95,487
2028	18,403	18,020	96,604
2029	18,640	18,244	97,792
2030	18,824	18,353	98,955
2031	19,012	18,645	100,266
2032	19,357	18,901	101,486
2033	19,498	19,122	102,597
2034	19,919	19,261	103,667
2035	20,135	19,674	104,729
2036	20,566	19,741	105,766
2037	20,789	20,008	106,726
Avg. Annual Growth Rate	1.2%	1.0%	1.0%

Table F-21: Summary of the Load Forecast Without UEE Programs and Excluding any Impacts from Demand Reduction Programs – DEP

Year	Summer (MW)	Winter (MW)	Energy (GWh)
2023	12,727	14,255	64,636
2024	12,843	14,479	65,263
2025	12,936	14,521	65,402
2026	13,023	14,509	65,533
2027	13,155	14,664	65,855
2028	13,181	14,634	66,350
2029	13,297	14,835	66,851
2030	13,363	14,820	67,352
2031	13,522	15,000	67,917
2032	13,636	15,085	68,613
2033	13,774	15,202	69,219
2034	14,176	15,295	69,885
2035	14,261	15,602	70,587
2036	14,406	15,643	71,351
2037	14,593	15,840	72,073
Avg. Annual Growth Rate	1.0%	0.8%	0.8%

Figure F-12: Load Duration Curve Without Energy Efficiency Programs and Before Demand Reduction Programs – DEC

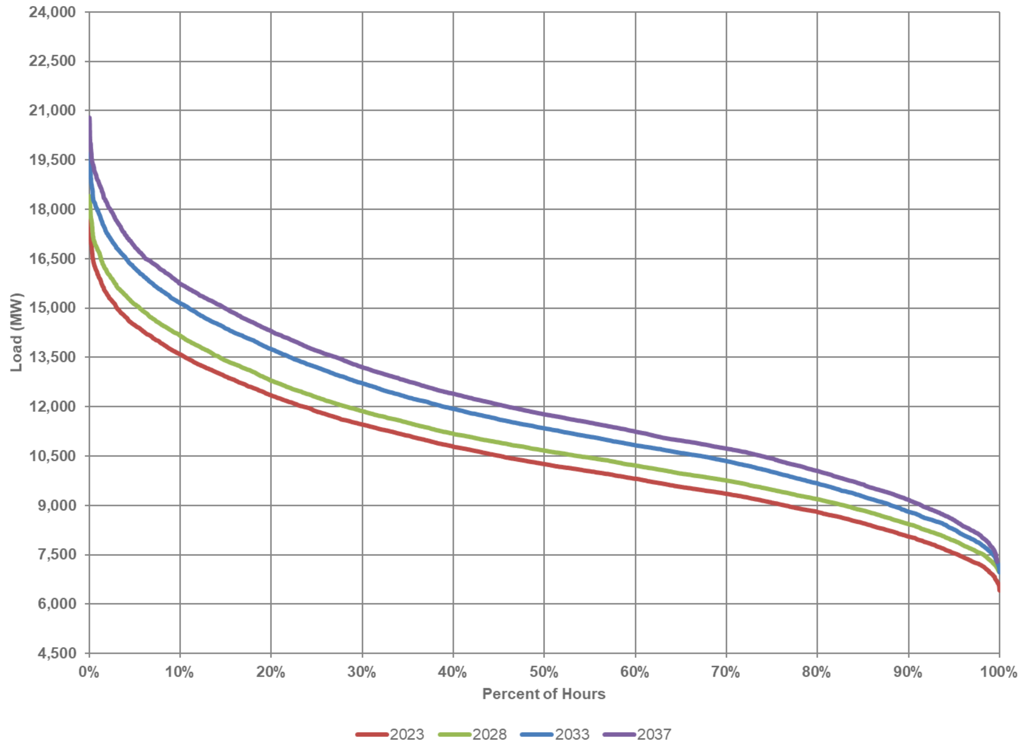


Figure F-13: Load Duration Curve Without Energy Efficiency Programs and Before Demand Reduction Programs – DEP

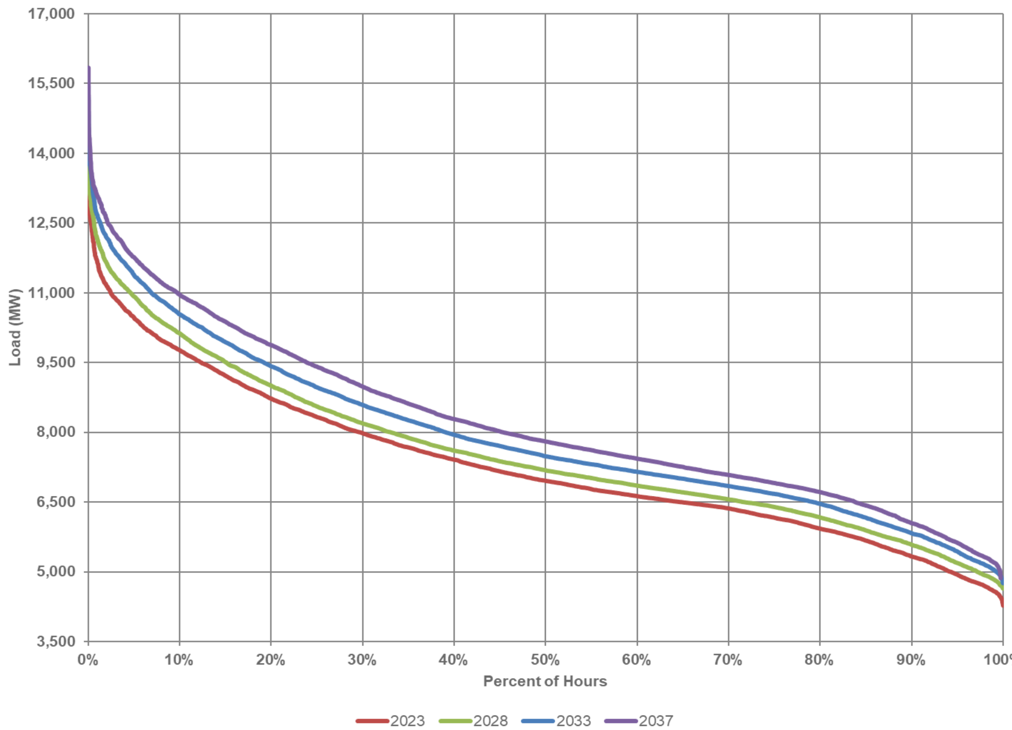


Table F-22: Summary of the Load Forecast with UEE Programs and Excluding any Impacts from Demand Reduction Programs – DEC

Year	Summer (MW)	Winter (MW)	Energy (GWh)
2023	17,522	17,231	91,983
2024	17,569	17,333	92,304
2025	17,640	17,383	92,349
2026	17,710	17,442	92,667
2027	17,788	17,461	93,100
2028	17,915	17,562	93,815
2029	18,089	17,724	94,629
2030	18,326	17,779	95,454
2031	18,556	18,024	96,466
2032	18,786	18,244	97,447
2033	18,993	18,436	98,372
2034	19,401	18,553	99,313
2035	19,609	18,893	100,289
2036	20,038	19,008	101,284
2037	20,273	19,286	102,343
Avg. Annual Growth Rate	1.0%	0.8%	0.8%

Table F-23: Summary of the Load Forecast with UEE Programs and Excluding any Impacts from Demand Reduction Programs – DEP

Year	Summer (MW)	Winter (MW)	Energy (GWh)
2023	12,655	14,206	64,259
2024	12,726	14,387	64,636
2025	12,763	14,387	64,525
2026	12,805	14,335	64,408
2027	12,904	14,432	64,486
2028	12,881	14,365	64,752
2029	12,961	14,532	65,051
2030	13,067	14,487	65,376
2031	13,203	14,644	65,795
2032	13,303	14,714	66,391
2033	13,437	14,821	66,937
2034	13,748	14,909	67,570
2035	13,832	15,212	68,254
2036	13,977	15,255	69,026
2037	14,175	15,461	69,817
Avg. Annual Growth Rate	0.8%	0.6%	0.6%

Figure F-14: Load Duration Curve with Energy Efficiency Programs & Before Demand Reduction Programs – DEC

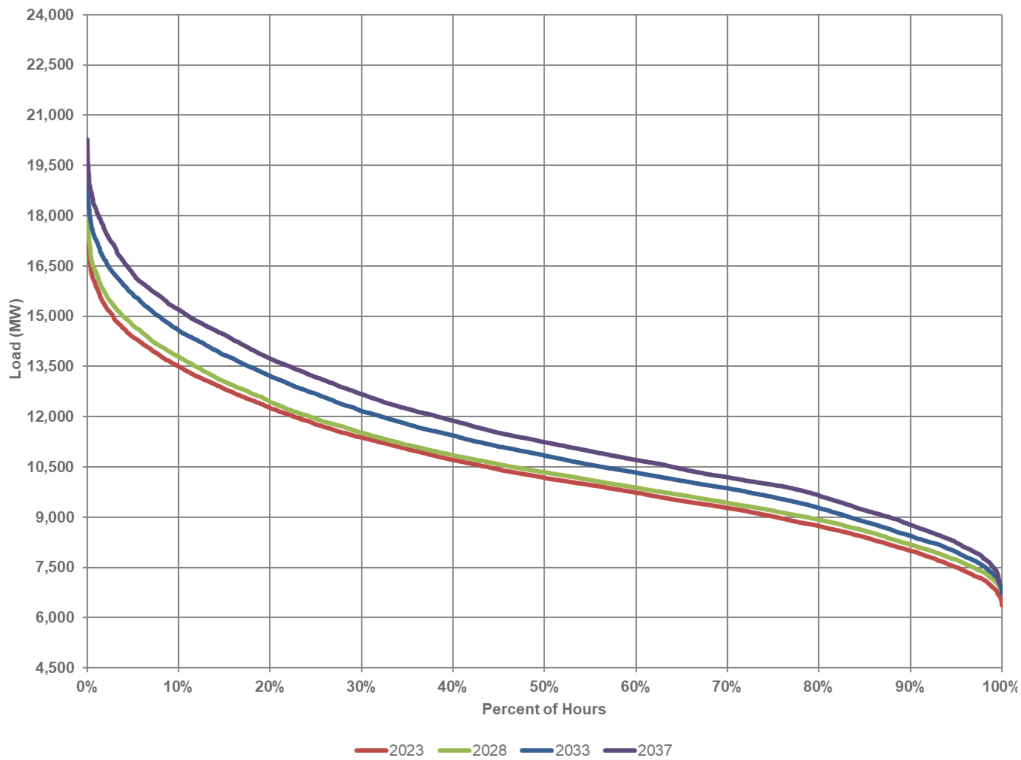


Figure F-15: Load Duration Curve with Energy Efficiency Programs & Before Demand Reduction Programs – DEP